4/14/2025	DATE	TEC	DIVISION
☑	REQUIRED COURSE	☐	NEW COURSE
☐	ELECTIVE COURSE	☑	REVISION

Lake Land College

Course Information Form

COURSE NUMBER:	TEC-070		TITLE: *(30 Characters Max)*		Properties of Metals						
SEM CR HRS:	2.5	Lecture:	2.5		Lab:	0.0	ICCB Lab:	0.0	ECH:	2.5	
Course Level:	☐ Gen Ed / IAI ☐ Baccalaureate /Non-IAI	☑ Career/Technical ☐ Dev Ed/ Not in Degree Audit			Clinical Practicum:	0.0	Work-based Learning:	0.0	WBL ECH:	0.0	
Course PCS & CIP:	12 - 15.0611		IAI Code:		N/A		Contact Hours (Minutes/Week)				
Repeatable (Y/N):	N	Pass/Fail (Y/N):	N	Variable Credit (Y/N):	N	Min:		Max:		16 Wks	125
										8 Wks	250
Prerequisites:	None										
Corequisites:	None										
Catalog Description: (40 Word Limit)	Familiarize the student with the need for heat treatment of metals, the processes and techniques used and the resulting effects. Also includes a study of the machinability of metals and the contributing physical and metallurgical factors.										

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Basic properties and characteristics of metal	8			
Test methods of microstructural analysis	5			
Heat treatment process and procedures for specific properties	6			
Relationship between heat treatment and metal failures with the manufacturing of iron and steel	13.5			
Identification of the composition of ferrous and nonferrous metals	5			
TOTAL	37.5	0	0	0

EVALUATION

QUIZZES ☑	EXAMS ☑	ORAL PRES ☐	PAPERS ☐
LAB WORK ☐	PROJECTS ☐	COMP FINAL ☑	OTHER ☑

Other: Assignments and Class Participation

COURSE MATERIALS

TITLE:	*Metallurgy Fundamentals*	
AUTHOR:	Daniel A. Brandt, J.C. Warner	
PUBLISHER:	Goodheart-Wilcox	
VOLUME/EDITION/URL:	5th	
COPYRIGHT DATE:	2009	

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		The student will be able to:
Basic properties and characteristics of metal	8	1. Define chemical terms and understand metallurgy. 2. Identify elements using the periodic table. 3. Demonstrate the measure of resistance or hardness. 4. Discuss the unique strengths, advantages and disadvantages of materials. 5. Identify the make-up of steel using the alloying elements numbering system.
Test methods of microstructural analysis	5	1. Describe the microscopic appearance of ferrite, pearlite, cementite, austenite and martensite by looking at their microstructures.
Heat treatment process and procedures for specific properties	6	1. Describe the purpose of annealing. 2. Apply practical quenching techniques. 3. Describe the three basic surface hardening methods.
Relationship between heat treatment and metal failures with the manufacturing of iron and steel	13.5	1. Understand the process used to manufacture iron and steel. 2. Explain deformation. 3. Describe five structural forms of steel and iron. 4. Plot a temperature-time line on an I-T diagram.

Identification of the composition of ferrous and nonferrous metals	5	1. Identify the make-up of ferrous metals using the alloying elements numbering system. 2. Identify and explain the basic processing methods used for nonferrous metals.
	37.5	

Outcomes*	At the successful completion of this course, students will be able to:
Course Outcome 1	Demonstrate hardness measurement on Rockwell C scale.
Course Outcome 2	Evaluate heat treatment techniques.
Course Outcome 3	Differentiate cast iron, carbon steel, alloy steel and non-ferrous metals.
Primary Laker Learning Competency	Communication: Students communicate through the exchange of information.
Secondary Laker Learning Competency	Creative Thinking & Problem Solving: Students think creatively to solve problems.

**Course and program outcomes will be used in the software for outcomes assessment and should include at least 1 primary and 1 secondary Laker Learning Competency. Limit to 3-5.*